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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/737,397	12/15/2000	Yasuaki Tsuchiya	14162	8837

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GARDEN CITY, NY 11530

EXAMINER
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GUERRERO, MARIA F

ART UNIT	PAPER NUMBER
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2822

DATE MAILED: 05/19/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/737,397

Applicant(s)

TSUCHIYA ET AL.

Examiner

Maria Guerrero

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 2-23-04.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 3, 4, 6, 7, 13-22, 33, 35, 36 and 39 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 3-4, 6-7, 13-22, 33, 35-36, and 39 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

### DETAILED ACTION

1. This Office Action is in response to the Amendment filed February 23, 2004.

Claims 1-2, 5, 8-12, 23-32, 34, 37-38, 40 are canceled.

Claims 3-4, 6-7, 13-22, 33, 35-36, and 39 are pending.

#### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 3-4, 6-7, 13-22, 33, 35-36, and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cadien et al. (U.S. 5,516,346) in view of Kaufman et al. (U.S. 6,063,306).

Cadien et al. teaches forming a concave in an insulating film formed on a substrate, forming a barrier layer, forming an interconnect metal film (copper or copper alloy) over the whole surface, polishing the surface by a first and second polishing processes until the surface of the insulating film other than the concave is exposed (Fig.4a-4c, col. 10, lines 5-20). Cadien et al. discloses using a polishing slurry comprising silica polishing material and an inorganic salt (fluoride salt) and an oxidizing agent (Abstract, col. 3, lines 1-5, col. 7, lines 1-10, 20-50, col. 8, lines 50-68).

Cadien et al. does not specifically show the polishing-rate ratio as claimed. However, Cadien et al. teaches controlling the etching rate of the barrier layer and the

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interconnect metal and controlling the etching rate of the interconnect metal and the insulating film (col. 7, lines 50-65, col. 8, lines 17-45, col. 9, lines 1-45).

Regarding claims 3-4, 6-7, 13-27, 33, 35-36, and 39, Cadien et al. fails to show the polishing slurry comprising an alkanolamine, a carboxylic acid, and benzotriazole. Cadien et al. fails to show the barrier film being a tantalum-containing metal film. However, Kaufman et al. shows applying a first slurry comprising an alkanolamine (such as, triethanolamine) and second slurry comprising carboxylic acid (such as, tartaric acid) in a polishing process as well known in the art. Kaufman et al. also teaches the slurry comprising benzotriazole and the barrier film being a tantalum-containing metal film (Abstract, col. 4, lines 15-67, col. 6, lines 2-45, col. 8, lines 20-45, col. 10, lines 50-65, TABLE 1, 4, col. 15, lines 25-65, col. 16, lines 48-67).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Cadien et al. reference by specifying the polishing rate as claimed and by including the specific compounds taught by Kaufman et al. in order to provide effective polishing at desired rates while minimizing surface imperfections and defects (Kaufman et al., col. 12, lines 10-15).

### ***Response to Arguments***

3. Applicant's arguments filed February 23, 2004 have been fully considered but they are not persuasive. Claims 3-4, 6-7, 13-22, 33, 35-36, and 39 stand rejected.

Applicant argued that Cadien et al. does not teach any particular polishing rate anywhere in the disclosure. However, Cadien et al. teaches controlling the etching rate

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of the barrier layer and the interconnect metal and controlling the etching rate of the interconnect metal and the insulating film. Cadien et al. also teaches several particular polishing removal rates (col. 7, lines 50-65, col. 8, lines 17-45, col. 9, lines 1-45).

Therefore, it would have been obvious to a person of ordinary skill in the art to specifying any desired polishing rate by simple calculation (e.g.  $1000 \text{ A/min} / 800 \text{ A/min} = 1.25$ ) (Cadien et al., col. 8, lines 17-45).

Regarding the second slurry composition and the barrier layer being tantalum, Kaufman et al. shows second slurry comprising carboxylic acid (such as, tartaric acid) in a polishing process as well known in the art and the use of tantalum (col. 7, lines 22-40, col. 8, lines 10-20).

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

In addition, during examination, the claims must be interpreted as broadly as their terms reasonably allow. This means that the words of the claim must be given their plain meaning unless applicant has provided a clear definition in the specification. In *re Zletz*, 893 F.2d 319, 321, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989); *MSM Investments Co. v. Carolwood Corp.*, 259 F.3d 1335, 1339-40, 59 USPQ2d 1856, 1859-60 (Fed. Cir. 2001).

***Conclusion***

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maria Guerrero whose telephone number is 571-272-1837.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on 571-272-1852. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Maria Guerrero  
Primary Examiner  
May 10, 2004